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REMARKS

Applicant(s) appreciate the Office's review of the present application. In response to the Office Action, the cited references have been reviewed, and the rejections and objections made to the claims by the Examiner have been considered. The claims presently on file in the present application are believed to be patentably distinguishable over the cited references, and therefore allowance of these claims is earnestly solicited.

In order to render the claims more clear and definite, and to emphasize the patentable novelty thereof, new claims 34-37 have been added. Accordingly, all elected claims presently on file in the subject application are in condition for immediate allowance, and such action is respectfully requested.

Rejections

Rejection Under 35USC Section 102(b)

Claims 1-7, 9-10, 17 and 18 have been rejected under 35 USC Section 102 (b), as being anticipated by European Patent Application EP 0 835 759 A1 to Ando et al. ("Ando"). Applicants respectfully traverse the rejection and request reconsideration based on the features in the other claims which are neither disclosed nor suggested in the cited reference.

As to a rejection under 102(b), "[a]nticipation is established only when a single prior art reference discloses expressly or under the principles of inherence, each and every element of the claimed invention." RCA Corp. v. Applied Digital Data Systems, Inc., (1984, CAFC) 221 U.S.P.Q. 385. The standard for lack of novelty, that is for "anticipation," is one of strict identity. To anticipate a claim, a patent or a single prior art reference must contain all of the essential elements of the particular claims. Schroeder v. Owens-Corning Fiberglass Corp., 514 F.2d 901, 185 U.S.P.Q. 723 (9th Cir. 1975); and Cool-Fin Elecs. Corp. v. International Elec. Research Corp., 491 F.2d 660, 180 U.S.P.Q. 481 (9th Cir. 1974).

Independent claim 1, and its dependent claims 2-7, 9-10, 17 and 18, are patentably

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distinguishable over the cited reference because claim 1 emphasizes the novel features which reduce drop placement error of main and satellite drops. In this regard, claim 1 recites a printhead for ejecting drops of a fluid onto a medium during movement along a scanning axis, which includes:

"a plurality of chambers for controllably ejecting the drops;
a nozzle member attached to the printhead and defining a wall of each of the chambers, the nozzle member having a planar surface positionable adjacent the medium; and
a plurality of nozzles formed in the nozzle member and in fluidic communication with each chamber, wherein certain ones of the nozzles have a nozzle axis tilted along the scanning axis." (emphasis added).

The Ando reference describes a carrier jet type printhead in which "an accurate quantity of the quantitative medium ... is mixed with the discharge medium, enabling an accurate gradation expression" (p.3, ln. 57-58) in order to "print out a natural image of high quality requiring reproduction of halftones"(p.2, ln15-16). As to these fluids, "one of the quantitative medium and the discharge medium is ink, and the other is diluent" (p.7, ln.34-35). As described with reference to Fig. 4, "the nozzle plate 41 is provided with a quantitative nozzle 53 ... and a discharge medium nozzle 54" (p.8, ln. 20-24). In order to provide for the mixing of the fluids, "the quantitative medium nozzle 53 is formed at a predetermined angle against the direction of the thickness of the nozzle plate 41, whereas the discharge medium nozzle 54 is formed in the direction of the thickness of the nozzle plate 41 so that the quantitative medium nozzle 53 approaches the discharge medium nozzle 54 toward the rear surface 41b and these nozzles have openings adjacent to each other on the rear surface 41b" (p.8, ln. 43-48). Figs. 12-18 schematically illustrate the emission of the fluids from nozzles 53, 54 and the mixing of the quantitative medium 45 and the discharge medium 49 (ink and diluent) to form the liquid mixture 69 which is ejected from the printhead.

However, the Ando reference does not disclose that "certain ones of the nozzles have a nozzle axis tilted along the scanning axis", as recited in claim 1. While the printers illustrated in Figs. 1, 32, and 33 of Ando variously depict directions M, M', and m of relative movement of the printhead 3, 90, 91 with respect to the paper 1, nowhere does the Ando reference disclose the orientation of any nozzle axis tilt (e.g. of quantitative nozzle 53) with

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respect to the direction of relative motion M, M', or m. For example, none of the figures illustrating the orientation of nozzles 53, 54 indicate any of these directions of relative motion. Therefore, the novel features of the present invention are not anticipated by the Ando reference in that at least the essential element of a nozzle axis tilted along the scanning axis is absent from the Ando reference. Consequently, the rejection of claims 1-7, 9-10, and 17-18 is improper and should be withdrawn.

Applicants direct the Office to an inconsistency in the Office Action regarding the status of claim 13. There is no statement of a rejection of claim 13 as being anticipated by Ando, but there is a discussion of claim 13 as part of the 102(b) portion of the Office Action. If the Office intended to also reject claim 13 as anticipated by Ando, Applicants respectfully traverse the rejection and request reconsideration based on the dependence of claim 13 from independent claim 1. Therefore, the rejection is improper at least for this reason and should be withdrawn.

Rejection Under 35USC Section 103

Claim 13 has been rejected under 35 USC Section 103 (a), as being unpatentable over Ando in view of U.S. patent 5,461,406 to Lorenze, Jr. et al. ("Lorenze"). Applicants respectfully traverse the rejection and request reconsideration based on the dependence of this claim from independent claim 1, whose reasons for allowability over Ando have been discussed heretofore and against which Lorenze has not been cited. Therefore, the rejection is improper at least for this reason and should be withdrawn.

Applicants direct the Office to a further inconsistency in the Office Action. There is no statement of a rejection of claims 2, 7, and 9 as being obvious over Ando in view of Lorenze, but there is a discussion of claims 2, 7, and 9 under this 103(a) portion of the Office Action. If the Office intended to reject claims 2, 7, and 9 as obvious over Ando in view of

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Lorenze, Applicants respectfully traverse any such rejection, and request reconsideration based on the dependence of these claims from independent claim 1, whose reasons for allowability over Ando have been discussed heretofore and against which Lorenze has not been cited. Therefore, the rejection is improper at least for this reason and should be withdrawn.

Applicants also believe that claims 7 and 9 further patentably distinguish over the Ando reference in view of the Lorenze reference. Claim 7 recites that "the nozzle axis is tilted between 0.2 degrees and 1.4 degrees from vertical", while claim 9 recites that "the nozzle axis is tilted between 0.4 degrees and 0.9 degrees from vertical". The Lorenze reference describes a printhead that "controls front face geometries" such as a "front face dicing angle" and a "thick film insulative layer etchback" in order to control an "effective meniscus tilt angle" (Abstract). Figs. 3(d), 5, and 6 of the Lorenze reference are illustrative in this regard. In Fig. 3(d), which illustrates misdirected satellite drops 46, the bore or channel of nozzle 27 is not tilted along the scanning (or process) axis, but rather is orthogonal to the plane of medium 48. In order to avoid these misdirected satellite drops, Figs. 5 and 6 illustrate how "[e]ffective meniscus tilt angles can be introduced during device processing by non-perpendicular front face dicing angles and/or etchback of the polyimide layer 18" (col. 6, line 66 to col. 7, line 2). In the Lorenze reference, the effective meniscus tilt angle is controlled within "acceptable process latitude windows for the dicing angle Θ_{DICE} and the polyimide etchback distance X_{PE} ... so that no print quality defects will occur due to misdirected satellite drops caused by too large of an effective mensicus tilt angle" (col. 8, lines 25-30). In other words, the effective meniscus tilt angle is controlled to avoid misdirected satellite drops by using a non-perpendicular front face dicing angle and/or polyimide layer etchback, without tilting the axis of the channel 20 of the nozzle. Therefore, the axis of nozzle channel 20 of the Lorenze reference is not tilted along the scanning (or process) axis at all, but rather is orthogonal to the plane of medium 48. The Lorenze reference avoids misdirected satellite drops by using a non-perpendicular front face dicing angle and/or polyimide layer etchback, without tilting the axis of the channel 20 of the nozzle. Applicants respectfully traverse the Office's assertion that it would have been obvious to a

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person of ordinary skill in the art at the time the invention was made to include the claimed features of Applicants' invention. Such could be possible only in hindsight and in light of Applicants' teachings. Therefore, the rejection is improper at least for this additional reason and should be withdrawn.

Claims 14, 16, and 19-20 have been rejected under 35 USC Section 103 (a), as being unpatentable over Ando in view of U.S. Patent 5,731,827 to Mantell et al. ("Mantell"). Applicants respectfully traverse the rejection and request reconsideration based on the dependence of these claims from independent claim 1, whose reasons for allowability over Ando have been discussed heretofore and against which Mantell has not been cited. Therefore, the rejection is improper at least for this reason and should be withdrawn.

Claim 15 has been rejected under 35 USC Section 103 (a), as being unpatentable over Ando in view of U.S. Patent 6,048,052 to Kitahara et al. ("Kitahara "). Applicants respectfully traverse the rejection and request reconsideration based on the dependence of this claim on independent claim 1, whose reasons for allowability over Ando have been discussed heretofore and against which Kitahara has not been cited. Therefore, the rejection is improper at least for this reason and should be withdrawn.

Applicants further respectfully traverse the rejection and request reconsideration based on features in the claim which are neither disclosed nor suggested in the cited references, taken either alone or in combination. In this regard, claim 15 recites a printhead wherein:

"the plurality of nozzles are grouped into a set of odd nozzles and a set of even nozzles, and wherein the nozzle axes of each of the set of odd nozzles is tilted in one direction along the scanning axis and the nozzle axes of each of the set of even nozzles is tilted in an opposite direction along the scanning axis". (emphasis added)

Conversely, the Kitahara reference does not disclose a tilt of nozzle axes. Rather, Figs. 1 and 9 illustrate a "nozzle opening arrangement" that is analogous to the view of nozzle member 75 in Applicants' Fig. 2. Any nozzle axes of the Kitahara reference are not visible in Figs. 1 and 9 because these axes would extend into the paper. The relationship between

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individual nozzles in rows C and D does not define nozzle axes. Applicants respectfully traverse the Office's assertion that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the claimed features of Applicants' invention. Such could be possible only in hindsight and in light of Applicants' teachings. Therefore, the rejection is also improper at least for this additional reason and should be withdrawn.

Conclusion

Attorney for Applicant(s) has carefully reviewed each one of the cited references, and believes that the claims presently on file in the subject application patentably distinguish thereover, either taken alone or in combination with one another.

Therefore, all claims presently on file in the subject application are in condition for immediate allowance, and such action is respectfully requested. If it is felt for any reason that direct communication with Applicant's attorney would serve to advance prosecution of this case to finality, the Examiner is invited to call the undersigned Robert C. Sismilich, Esq. at the below-listed telephone number.

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FOR THE ACCEPTANCE OF ANY NECESSARY FEES**

If any charges or fees must be paid in connection with the foregoing communication (including but not limited to the payment of an extension fee or issue fees), or if any overpayment is to be refunded in connection with the above-identified application, any such charges or fees, or any such overpayment, may be respectively paid out of, or into, the Deposit Account No. 08-2025 of Hewlett-Packard Company. If any such payment also requires Petition or Extension Request, please construe this authorization to pay as the necessary Petition or Request which is required to accompany the payment.

Respectfully submitted,



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